# SUBTROCHANTERIC FRACTURE OF THE FEMUR

By W. G. Anglin, M.D., M.R.C.S. (Eng.), F.A.C.S.

*Kingston, Ont.*

THIS brief note on the subject of the treatment of the above fracture is not submitted for the attention of the metropolitan surgeon of large experience, but more particularly for the practitioner who may have comparatively few opportunities of dealing with this form of injury.

In many cases fractures must of necessity be treated in the home, and cannot have the benefit of the skilled attention of the surgeon of a large city hospital, who probably, in the light of modern opinion and with the aid of well qualified assistants, would be influenced to treat this special form of fracture by the open method and secure the apposition of the fragments by a Lane's plate.

If we can secure equally good results without submitting the patient to operation and retention of the metal plate, I believe it is a consummation much to be desired. All surgeons are aware of the difficulty of securing a good result by ordinary traction apparatus in the case of a fracture of the femur just below the trochanters, because the displacement of the short upper fragment cannot be overcome by traction alone. The lower fragment must first be brought into line with the upper fragment by flexion and abduction of the thigh, and slight rotation outwards.

The main object of this paper is to emphasize the treatment of subtrochanteric fracture of the femur by the special splint known as Hodgen's, which while giving uniformly good results, at the same time minimizes the amount of surgical nursing required, and gives to the patient the utmost degree of physical comfort. The treatment can be carried out in the home without a special nurse under the supervision of the attending surgeon.

Under the heading subtrochanteric fracture we include all fractures occurring in the upper third of the shaft of the femur. Most of the cases under my observation have been due to direct

Read at the annual meeting of the Canadian Medical Association, St. John, N.B., July 7th, 1914.

violence. In one case simultaneous fracture of both femora occurred in a lad of fourteen years of age who fell in front of a threshing machine which was being drawn along the road by a traction engine. The Hodgen's splint was not used in this case, the left femur being treated by a double inclined plane with traction, while the right femur was plated. Another young man was struck by a swinging bucket in a mine and sustained a fracture of his left femur. In one case, that of a school boy aged twelve, the fracture was occasioned simply by his being pushed off the sidewalk by a companion.

In all the cases the usual displacement was found, namely, flexion, abduction and outward rotation of the upper fragment, while the lower fragment dropped backwards and was pulled upwards. The diagnosis in each case was confirmed by *x*-ray examination. The ordinary signs of fracture were well marked and there was shortening of the limb with marked eversion of the foot. Bruising and swelling of the thigh was very evident in some of the cases and treatment for a few days was directed towards the reduction of this swelling before making use of the permanent splint, the limb meanwhile being supported and kept at rest by means of sand bags.

The well-known principles underlying the treatment of fractures are, first, correction of the deformity by the reduction of the fragments and, secondly, fixation of the broken bone when the fragments are placed in apposition by suitable retention dressings and apparatus until bony union has taken place. Treatment by Buck's extension and long T-splint is utterly unsuited to this form of fracture, as there is very little control over the upper fragment. The lower fragment must be brought into line with the upper fragment, and to do this and retain the fragments in apposition I know of no splint which is so admirably adapted for the purpose as Hodgen's.

Hodgen's splint is a metal frame made to suit the individual case and may be obtained from any competent blacksmith who will follow the instructions of the surgeon. It consists of two parallel bars preferably of three-eighths inch steel conforming to the width and length of the injured limb, and bent at a point corresponding to the knee joint. These bars are connected at the lower end about six inches below the sole of the foot by a straight bar, and at the upper end by a curved bar elevated a few inches above the groin and parallel with Poupart's ligament. So that the splint may be suspended, a pair of hooks is placed on the bars about midway

between the groin and knee, and another pair between the knee and ankle. Strips of flannel, or preferably canvas, about four inches wide are attached by being stitched to one of the bars, and adjusted by safety pins to the opposite bar so as to form a sling or hammock to comfortably support the limb. The ordinary Buck's extension strips of adhesive plaster are placed on the limb, the strips extending well up to the upper end of the lower fragment. The degree of flexion of the thigh is regulated as required to secure apposition of the fragments by the length of the canvas strips supporting the thigh. The extension cord from the spreader below the foot is to be fixed to the lower bar of the splint, thus making the necessary extension when the limb is suspended.

Before placing the limb in the splint, an anæsthetic is administered to the patient and four coaptation splints are carefully adjusted to the thigh while an assistant, grasping the leg and foot, makes the necessary extension and flexion. Gooch's splinting or poroplastic felt is used for this purpose. The anterior and posterior splints are bevelled to fit the groin and buttock respectively and extend to just above the knee, and internal and external splints of appropriate length are applied. These splints, properly padded, are held in position by strips of adhesive plaster.

The limb is then placed in the Hodgen's splint and the canvas strips pinned in position. At the foot of the bed, which is raised on six inch blocks, an upright bar is attached with a pulley about six feet above the bed from which the splint is to be slung. Cords are attached to the hooks at the sides of the splint and lead to a pulley, and from this another cord passes over the pulley on the upright bar. This latter pulley is arranged to one side so that the limb is abducted and rotated outwards. The obliquity of the supporting cord should be from 15° to 30°, and this obliquity can be altered by changing the position of the patient's body in the bed. The cord is attached to the foot of the bed after passing over the pulley. Fracture boards should be placed under the mattress. The leg should swing clear of the mattress, the patient's heel being a few inches from the bed.

This arrangment gives the patient the greatest degree of comfort. There is no restriction to the body as the splint accommodates itself to changes of position and the semi-recumbent position may be assumed without disturbing the apposition of the fragments. The bed pan may readily be adjusted from the sound side with the greatest of ease and without causing the patient any inconvenience. This splint may be used for all fractures of the

shaft of the femur except at the extreme lower end, but particularly for fractures of the upper end.

Union takes place early. Rapidity of repair was characteristic of all the cases treated. In several cases within a fortnight of the application of the splint, the great trochanter was found to move in unison with rotation of the whole limb, showing that a certain amount of union had taken place in that time. The splint, however, was retained in all cases for eight weeks, and then the patients were allowed to move about on crutches, The favourable results obtained seem to me to justify calling attention to the employment of Hodgen's splint for the treatment of these fractures.

*Discussion*

Dr. C. L. Starr: Regarding the treatment of fractures of the upper third of the thigh in young children, we find that the reduction of the fracture in the *x*-ray room, taking a skiagraph before and after, with application of plaster of Paris from nipple to toes, gives us the best result. After the application of the plaster the patient is placed on a modified Bradford frame with an opening at the pelvis. This is carried on cross bars above the level of the bed.

Dr. F. N. G. Starr asked Dr. Anglin the object of the coaptation splints. Personally he could see no object in their use. His objection to all kinds of fancy splints was that so much attention is given to the proper application of the splint that the necessity of reducing the fracture is overlooked. He had abandoned the splint described because of the impossibility of getting efficient extension.

Dr. Anglin fully endorsed the remarks as to the treatment of these fractures in young children. He only advocated the use of Hodgen's splint in the case of adults. Regarding Dr. F. N. G. Starr's question, Dr. Anglin replied that in the treatment of fracture of long bones the use of coaptation splints was so obvious that comment was unnecessary. Hodgen's splint was not a *fancy* splint, but one that could be readily made by any blacksmith, and the perfect results obtained in Dr. Anglin's cases was sufficient proof to him that efficient extension was secured.

The actual application of the splint was illustrated on a patient with suppositious fracture.